Arachnoid cysts

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Arachnoid cysts possess several features that make them ideal targets for primary endoscopic fenestration. First, the target membrane is typically avascular. Second, there are generous amounts of CSF for optimal image transmission. Third, the technique of membrane fenestration is amply familiar to surgeons regularly practicing neuroendoscopy, principally through the experience of performing endoscopic third ventriculostomy. Lastly, there is no traditional approach that is universally agreed upon as being optimal. While the rationale for primary endoscopic fenestration has been collectively accepted for some arachnoid cyst variants, notably the prepontine arachnoid cyst, there justifiably remains considerable disagreement about its role for cysts of the middle temporal fossa.5–11

In reading the recent publication by Dr. El-Ghandoor, 1 one would conclude that much of the ongoing debate regarding optimal management of middle cranial fossa arachnoid cysts (MCFACs) has come to closure. Of 32 children with “symptomatic” arachnoid cysts treated with a purely endoscopic fenestration, reported rates of improvement were 87.5% for clinical assessment and 71.9% for radiographic dimensions. Furthermore, 100% of patients with preoperative headache or skull deformity showed improvement. These admirable results include a low complication rate that was composed of a clinically silent subdural hygroma in 2 children and a transient third cranial nerve paresis in 1 patient. While these results could redefine our expectations regarding this form of treatment for children with MCFACs, a degree of caution is called for because these findings are appreciably incongruous with recently published clinical results as well as our own personal experience.3,5–9

With regard to operative indications, we support the consensus that treatment should be reserved for symptomatic patients.2–7,9,10 The operative indications included in the current paper beg some clarification. While there is no argument about offering treatment to children with raised intracranial pressure, the interpretation of this finding is frequently subjective. The definition of “symptomatic” in this current series included cranial deformity (temporal bulging), a frequent finding in infants and young children who are otherwise without symptoms. Further, 72% of children underwent treatment due either to symptoms of headache or signs of macrocrania. These features frequently are not related to elevated intracranial pressure. The rate and trend of head circumference growth (unknown in the current paper) is more meaningful than a single measurement. Similarly, headache alone without supportive evidence can be tenuous as a sole justification for surgery. While papilledema is unambiguous in documenting raised intracranial pressure, the frequency of that finding (37.5%) in this cohort of 32 children is appreciably higher than in most reported series.5,9 While the author notes that prophylactic surgery may be offered to avoid the potential of subdural hematoma, there exists limited clinical data to discount this notion. Recent evidence is convincingly clear that the potential for symptomatic progression in an otherwise asymptomatic child is exceedingly rare.4 In fact, the association of intracranial hemorrhage with arachnoid cysts has been documented after head injury despite long-term postsurgical neuroradiological confirmation of MCFAC size reduction and symptom resolution.6 In short, the indications for surgical treatment of MCFAC are highly variable and open to interpretation.

The outcome in this series of 32 patients is even more impressive given the described technique. The author used an embolectomy catheter to create a single fenestration in 75% of patients without intraoperative computer-assisted neuronavigation. This “simple” technique of endoscopic fenestration warrants some elaboration and
annotation. Within the heading of endoscopic fenestra-
tions, we believe that those involving arachnoid cysts of
the middle cranial fossa are actually the most complex
and challenging, a sentiment that is echoed in the pub-
lished literature. The juxtaposition of critical structures
to the mesial membranes, the limited space between these
neurovascular limits, and the reliance on a single endo-
scopic instrument all result in a procedure that can be
intimidating and frequently lengthier than a traditional
approach. In our experience, the target membrane is com-
monly multilaminated and often requires utilization of a
biportal technique that makes use of a second instrument
to create an adequate fenestration.

The widespread application of neuronavigation sys-
tems has enhanced accuracy and developed in a comple-
mentary and parallel fashion with neuroendoscopy. Orientation
within large MCFACs can be difficult and we
strongly advocate the use of neuronavigation in these
neuroendoscopy cases to enhance the precision and safe-
ty of the procedure. In addition, current neuronavigation
systems allow for preoperative multiplanar workstation
planning of endoscope trajectory and the use of frameless
and pinless navigation in the pediatric setting. Even in
light of the excellent results by Dr. El-Ghandour, we con-
tinue to advocate that stereotaxy be employed to translate
a fixed linear trajectory into an ideal entry into

This current series contributes to the growing body of
evidence demonstrating the efficacy of neuroendoscopic
fenestration in managing symptomatic MCFACs. How-
ever we suggest that a productive debate continue regard-
ing the use of purely endoscopic fenestration until similar
outstanding results are reproduced by others using a well-
deфини™ed set of surgical indications and outcome measures.
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Disclosure

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scopy fellowship supported in part by Aesculap.

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Response

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First of all, I would like to thank Drs. Kandasamy and Souweidane for taking the time to highlight impor-
tant issues pertaining to my paper. As they point out, the indications for surgical treatment of MCFACs are vari-
able and not well established. However, I tried as much as
possible to have a well-defined set of surgical indications.
All the patients included in the current series have specif-
ic cyst-related clinical symptoms. Headache was present
in 12 cases, and it was attributed to increased intracranial
pressure as evidenced by the presence of papilledema. I
also considered macrocrania in children under 2 years of
age, if associated with compression of adjacent brain pa-
renchyma and/or temporal bulging, as an indication for
surgery because the potential for brain expansion is still
present. Although recommended by others, prophylac-
tic surgery in asymptomatic patients has never been per-
formed in the present study.

There is no argument that intraoperative computer-
asstisted neuronavigation provides increased accuracy and
safety to any endoscopic procedure, and it plays a crucial
role in some cases of arachnoid cysts such as those that
have paraxial location, because no anatomical landmarks
are precise that allow for intraoperative orientation. Never-
theless, I believe that its role in the endoscopic treat-
ment of MCFACs is dispensable for 2 reasons. First, iden-
tification of the anatomical landmarks and localization of
the fenestration target point are usually easily accompl-
ished if the neurosurgeon becomes familiar in dealing
with these cases. Second, in some cases, especially those
with Type III cysts, there is increased intracystic
pressure, which results in significant CSF loss once the cyst is
entered by the working sheath, leading to intraoperative
brain shift and errors in measurements.

Purely endoscopic fenestration in MCFACs, with
some elaboration, is becoming a simple and safe proce-
dure, which results in a high incidence of clinical and
radiological improvement with minimal morbidity. Such
results are comparable to microsurgical marsupialization.
The excellent results achieved in the current study would
support the rationale for primary endoscopic fenestration
in the treatment of MCFACs. Another recent study using

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a purely endoscopic fenestration has also reported almost the same results with a low complication rate, which adds to the documentation of the efficacy and safety of the procedure. Of more concern should be the incidence of reclosure of these fenestrations during long-term follow-up. It has been reported that MCFACs have been associated with high postoperative recurrence rates due to membrane thickness and vascularity. Whether the concomitant use of other visualization tools such as microscopy or neuronavigation with endoscopy has any influence on decreasing the incidence of recurrence over the long-term follow-up remains to be addressed.

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